

REMARKS

The present application was filed on July 17, 2003, with claims 1-38. Claims 1-38 are currently pending in the application. Claims 1, 16, 18, 23, 25, 34, 37 and 38 are the independent claims.

In the outstanding Office Action dated April 4, 2007, the Examiner has: (i) rejected claims 1, 5, 12-14, 16, 17, 25, 28, 33 and 38 under 35 U.S.C. §103(a) as being unpatentable over European Patent Application Publication No. EP1367752 (hereinafter “Sano”) in view of U.S. Patent Application Publication No. US 2004/0047296 (hereinafter “Tzannes”); (ii) rejected claims 2-4, 6, 26, 27, 29 and 34 under §103(a) as being unpatentable over Sano and Tzannes, further in view of U.S. Patent No. 6,522,696 (hereinafter “Mobin”); (iii) rejected claims 7-9, 30 and 31 under §103(a) as being unpatentable over Sano, Tzannes and Mobin, further in view of U.S. Patent No. 6,215,827 (hereinafter “Balachandran”); (iv) rejected claims 10 and 32 under §103(a) as being unpatentable over Sano, Tzannes and Mobin, further in view of U.S. Patent Application Publication No. 2003/0157914 (hereinafter “Li”); (v) rejected claim 11 under §103(a) as being unpatentable over Sano, Tzannes and Li, further in view of Balachandran; (vi) rejected claim 15 under §103(a) as being unpatentable over Sano and Tzannes, further in view of Balachandran; (vii) rejected claims 18-20, 23, 24 and 37 under §103(a) as being unpatentable over Sano, Tzannes and Mobin, further in view of Balachandran; (viii) rejected claims 21 and 22 under §103(a) as being unpatentable over Sano, Tzannes, Mobin and Balachandran, further in view of Li; (ix) rejected claim 36 as being unpatentable over Sano, Tzannes, Mobin and Balachandran, further in view of U.S. Patent Application Publication No. 2005/0130595 (hereinafter “Shurvinton”); and (x) indicated that claim 35 contains allowable subject matter.

In this response, Applicants traverse the above rejections. Nonetheless, Applicants have amended independent claims 1, 18, 25, 34, 37 and 38 without prejudice solely to expedite allowance by making explicit that the recited “received signal” and “channel estimation signal” constitute distinct signals. Moreover, claim 35, which was indicated as containing allowable subject matter,

has been rewritten in independent form. Applicants respectfully request reconsideration of the present application in view of the amendments above and the remarks below.

Applicants submit that the references, when considered either individually or in combination, fail to teach or suggest every limitation of each claim. Specifically, in formulating the rejections of each of the independent claims, the Examiner relies upon Sano, column 6, lines 44-58 for the teaching of at least the claim limitations hereinafter cited. Applicants respectfully submit that none of these limitations are taught or suggested by the relied-upon portions of Sano, which discloses:

a channel estimating unit that calculates a channel estimate value for each subcarrier, by using the common pilot portion; a delay unit that delays each Fourier-transformed subcarrier signal by a time required to carry out the extraction processing, and the channel estimate processing; a fading compensating unit that carries out a fading compensation to each of the delayed subcarrier signals, by using each of the channel estimate values; an inverse spread spectrum unit that inverse spreads frequency of each of the fading-compensated subcarrier signals; an SIR estimating unit that estimates a signal-to-interference ratio by using the known series portion included in [the subcarrier group signal]

Independent claims 1, 25 and 38, as amended, are directed to a method, a circuit, and a semiconductor device, respectively, each of which contains similar limitations substantially directed toward “generating at least one reference field based, at least in part, on the at least one field in the received signal and on a channel estimation signal . . . distinct from the received signal. . . and generating a signal quality estimate as a function of the at least one field in the received signal and the generated at least one reference field.”

Applicants respectfully submit that the relied-upon portion of Sano fails to teach or suggest the claim limitation of generating a reference field based on a field of the received signal and on a distinct channel estimation signal. Instead, Sano teaches away from this limitation by teaching the calculation of a channel estimate value using a field in the received signal (the common pilot portion), then carrying out a fading compensation on the received signal based on this channel estimate value.

Contrast this with the techniques of the present invention, as described on page 10, lines 9-12 of the specification with reference to FIG. 3, wherein the channel estimation signal constitutes a distinct input from the received signal, rather than being based on the received signal itself: “The output of block 302 comprises the recovered SIGNAL field, which is subsequently used to generate a reference SIGNAL field. The recovered SIGNAL field generated by block 302 is fed to multiplier 304 where it is combined with a channel estimation signal presented to a second input 320 of the exemplary circuit 300.”

The relied-upon portion of Sano also fails to teach or suggest the claim limitation of “generating a signal quality estimate as a function of the at least one field in the received signal and the generated at least one reference field.” Here, again, Sano teaches away by instead disclosing “a SIR estimating value that estimates a signal-to-interference ratio by using the known series portion included in the subcarrier group signal;” in other words, generating a signal quality estimate based on only one input, namely a field in the received signal. Additionally, it should be noted that Sano discloses only a technique requiring the incorporation of a known-series portion into the signal, whereas our invention permits the use of a signal which does not include a known series, such as the SIGNAL field as defined in the 802.11 specification.

Independent claim 16 is directed to a method including the steps of “measuring at least one characteristic corresponding to the at least one field in the received signal; and generating a signal quality estimate as a function of the at least one characteristic corresponding to the at least one field in the received signal.”

Applicants respectfully submit that the relied-upon portion of Sano fails to teach or suggest the claimed step of “measuring at least one characteristic corresponding to the at least one field in the received signal and generating a signal quality estimate as a function of the at least one characteristic corresponding to the at least one field in the received signal.” Instead, Sano teaches away from the subject claim by teaching the step of generating a signal quality estimate as a function of a field in the received signal rather than as a function of at least a characteristic corresponding to a field in the

received signal: “an SIR estimating unit that estimates a signal-to-interference ratio by using the known series portion included in the subcarrier group signal.”

Independent claims 18, 34 and 37, as amended, are directed to a method and circuits, respectively, each of which contains similar limitations substantially directed toward “generating at least one reference field based at least in part on the at least one field in the received signal and on a channel estimation signal . . . distinct from the received signal. . . ; comparing the at least one field in the received signal with the at least one reference field and generating a difference signal corresponding thereto; [and] generating a signal quality estimate, the signal quality estimate being a function of the difference signal.”

As discussed above with reference to independent claims 1, 25 and 38, as amended, the relied-upon portion of Sano fails to teach or suggest the claimed step of generating a reference field based on a field of the received signal and on a channel estimation signal distinct from the received signal. Instead, Sano teaches away from this claim limitation by teaching the calculation of a channel estimate value using a field in the received signal (the common pilot portion), then carrying out a fading compensation on the received signal based on this channel estimate value.

The Examiner contends that Mobin at column 10, lines 22-32 teaches the claim limitation of “generating a signal quality estimate, the signal quality estimate being a function of the difference signal.” The relied-upon portion of Mobin discloses calculating a branch metric “for each possible transition from one individual state to the next individual state” as a Euclidean distance between “the components of each reconstructed signal sample” and “the components of the received signal sample.” Even if this branch metric could be considered analogous to the recited difference signal, the relied-upon portion of Mobin fails to teach or suggest generating a signal quality estimate as a function of the branch metric. Indeed, rather than using the branch metric to generate a signal quality estimate, Mobin instead teaches away by disclosing a technique wherein a Viterbi decoder “employs this branch metric to determine the remaining paths,” thereby determining which bit sequence is the most likely to have been transmitted. See Mobin at column 9, lines 46-63.

Independent claim 23 is directed to a method including the steps of “measuring at least one characteristic corresponding to the first field in the received signal; [and] generating a signal quality estimate as a function of a difference between the at least one characteristic corresponding to the first field in the received signal and at least one threshold corresponding to the at least one characteristic.”

Applicants respectfully submit that the relied-upon portion of Sano fails to teach or suggest these claim limitations. Indeed, nowhere do the cited portions of Sano disclose any threshold corresponding to a characteristic corresponding to a field in the received signal, much less generating a signal quality estimate as a function of a difference between such a threshold and the characteristic to which it corresponds. Instead, Sano teaches away from the claim limitation by teaching a method of generating a signal quality estimate as a function of a field in the received signal: “an SIR estimating unit that estimates a signal-to-interference ratio by using the known series portion included in the subcarrier group signal.”

Applicants thus respectfully submit that the section of Sano upon which Examiner relies upon fails to disclose certain limitations of each independent claim. Applicants further contend that the other references cited by the Examiner fail to remedy these deficiencies and that the combination of references relied upon by the Examiner thus fail to teach and suggest each and every limitation of the independent claims. Applicants further submit that there is insufficient objective motivation to combine the references cited by the Examiner, as well as a lack of reasonable expectation of success in doing so.

Specifically, the Examiner appears to be engaging in hindsight-based piecemeal analysis. See, e.g., Princeton Biochemicals, Inc. v. Beckman Coulter, Inc., 411 F.3d 1332, 1337, 75 USPQ2d 1051, 1054 (Fed. Cir. 2005) (“[I]n making the assessment of differences between the prior art and the claimed subject matter, section 103 specifically requires consideration of the claimed invention ‘as a whole.’ . . . Without this important requirement, an obviousness assessment might successfully break an invention into its component parts, then find a prior art reference corresponding to each component. This line of reasoning would import hindsight into the obviousness determination by using the invention as a roadmap to find its prior art components.”); Ruiz v. A.B. Chance Co., 357

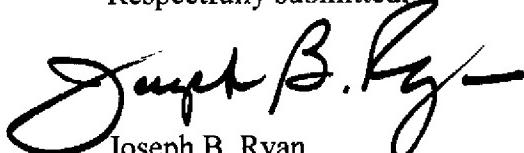
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Art Unit: 2611

F.3d 1270, 1275, 69 USPQ2d 1686, 1690 (Fed. Cir. 2004) (“The ‘as a whole’ instruction in [35 U.S.C. §103(a)] prevents evaluation of the invention part by part. Without this important requirement, an obviousness assessment might break an invention into its component parts (A + B + C), then find a prior art reference containing A, another containing B, and another containing C, and on that basis alone declare the invention obvious. . . . Section 103 precludes this hindsight discounting of the value of new combinations by requiring assessment of the invention as a whole.”)

Applicants submit that claims 2-14, which depend from claim 1; claim 17, which depends from claim 16; claims 19-22, which depend from claim 18; claim 24, which depends from claim 23; claims 26-33, which depend from claim 25; and claim 36, which depends from claim 34, are also patentable over the prior art of record by virtue of their dependency from their respective base claims, which are believed to be patentable for at least the reasons given above. Furthermore, one or more of these claims define additional patentable subject matter in their own right.

In view of the foregoing, claims 1-38 are believed to be in condition for allowance, and such favorable action is respectfully solicited.

Respectfully submitted,



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Date: July 2, 2007